long as we observe at the earth's surface, no matter how high the mountain top on which we stand, the atmosphere remains above us, and some estimate must be made of its transmission before the solar constant can be determined. Different persons will differ in the degree of confidence which they will ascribe to measurements of the atmospheric transmission, such as have been considered, and there are still some who totally disbelieve in the accuracy of the results thus far obtained, even though they be confirmed by observations at such differing altitudes. Accordingly it has seemed highly desirable to check the results by a method of direct observation by the pyrheliometer, attaching the instrument for this purpose to a balloon and sending it to the very highest possible altitudes. By a cooperation between the Smithsonian Institution and the United States Weather Bureau, experiments for this purpose were made in July and August of the year 1913.

The instruments employed were modified in form from the silver-disk pyrheliometer, which has been described above. As the apparatus could not be pointed at the sun the disk was placed horizontally, and the thermometer was contrived to record its temperature by photography upon a moving drum. The receiving disk was alternately exposed to the sun and shaded by the intervention of a shutter, operated intermittently by the clock work which rotated the drum under the stem of the thermometer. Five instruments of this kind were sent up on successive days. While it was well known that the temperature of the higher air would go as low as —55° C., it was believed that a blackened disk exposed half the time to the direct sun rays, would certainly remain above the temperature of —40°, which is the freezing point of mercury. This expectation was disappointed. Accordingly, owing to the freezing of the mercury in the thermometer, the highest solar radiation records obtained during the expedition were at the altitude of 13,000 meters, although the balloons in some instances reached the altitude of 33,000 meters.

The results obtained, while they have not the same degree of accuracy as those obtained by direct reading of the silver disk pyrheliometer, are yet of considerable weight. All the measurements unite in indicating values of the solar radiation at altitudes of 10,000 meters and higher, which fall below the value of the solar constant of radiation as obtained by other methods, and above the value of the radiation at the summit of Mount Whitney as obtained by different observers with pyrheliometers. It is expected in the coming year to repeat the observations with balloons under much improved circumstances. By aid of electrical heating apparatus it is expected to keep the surroundings of the disks at approximately the freezing temperature, even though exposed to the air at temperatures as low as —55° C. In this way it is hoped to obtain good pyrheliometer measurements as high as it is possible for sounding balloons to go, and possibly to an altitude of 40,000 meters. As the atmospheric pressure at such altitudes is less than 1 per cent. of that prevailing at sea level, the experiments, if successful, may be expected to remove reasonable doubt of the value of the solar constant of radiation.

C. G. Abbot

SETH CARLO CHANDLER

Dr. Seth Carlo Chandler, eminent astronomer, died on December 31, 1913, in his sixty-seventh year after a short attack of pneumonia.

Born at Boston, Mass., September 17, 1846,

the son of Seth Carlo and Mary (Cheever) Chandler, he spent his early childhood in and around Boston. He attended the English high school at Boston, graduating in 1861, but did not pursue a collegiate course as he had already become interested in mathematical computations while still at the high school, being employed upon the computations of Professor Benjamin Peirce. After graduation he joined Dr. B. A. Gould as private assistant and thus obtained his first taste for astronomical subjects. Dr. Gould was at that time busily engaged in developing the longitude-determinations of the Coast Survey, and through him Dr. Chandler joined the U. S. Coast Survey as aid in 1864. Later when Dr. Gould made his historic expeditionary trip to the Argentine Republic, which eventually resulted in the establishment of a national observatory by the Argentine government, Dr. Chandler refused an offer to accompany the expedition in favor of a position as actuary with the Continental Life Insurance Co. of New York, removing to New York City. It was shortly after this that he married Miss Caroline M. Herman, of Boston, on October 20, 1870.

Seven years later he returned to Boston to accept a position as consulting actuary for the Union Mutual Life Insurance Co. of Boston.

But though his life had been thrown into other channels, Dr. Chandler still felt an interest in astronomical subjects, so it was not surprising that with Harvard College Observatory so near at hand, he should have joined the work of the observatory. Astronomers had long felt the need of some system of communicating such discoveries as comets in order that such objects might not be lost through the inability to observe them at any one station. Realizing this need, Dr. Chandler and Mr. John Ritchie formulated a code for the speedy transmission of discoveries by telegraph to observatories all over the United States. Though the system has been revised, it is still being operated by the Harvard College Observatory.

It was during his connection with Harvard College Observatory that Dr. Chandler invented and constructed the almucanter, an instrument for measuring stellar positions.

After the year 1886 he became a private investigator. There are many instances of men who, while deriving their source of income from other professions, have become interested in astronomy, and who have accomplished remarkable results; but among these there is none to compare with Dr. Chandler, whose whole soul seemed wrapped up in his astronomical investigations.

When one considers that he was the author of over two hundred articles, it can readily be imagined what a serious interest he took in his chosen field, and what a hard worker he was. It has been remarked of many authors that they have only written when the spark of genius inspired them. So it was with Dr. Chandler, who at times would take an almost complete rest from his astronomical labors, only to enter one orgie after another of concentrated effort. While under the spell of one of these sieges, nothing could divert him, but once over it he was ready for any form of diversion or entertainment, taking a great interest in many outside affairs.

As an astronomer Dr. Chandler will possibly be chiefly remembered for his work upon variable stars, and for his historic discovery of the variation of latitude. As a result of his discovery of the variation of latitude, international latitude stations have been established at different points of the earth in order to study the periodic shifting of the earth's pole. Dr. Chandler treated a great variety of other subjects with thoroughness.

For his brilliant work he received the Watson medal of the National Academy of Sciences in 1895, and in 1896 he received the gold medal of the Royal Astronomical Society. De Pauw granted him the degree of LL.D. in 1891.

Upon the death of Dr. Gould, founder and first editor of the *Astronomical Journal*, Dr. Chandler assumed the editorship, which he held during the period 1896–1909, resigning at the latter date because ill health prevented

him from performing his editorial duties. Until his health broke down he had devoted not only much time to the *Astronomical Journal,* but considerable aid from his private purse, a truly conclusive proof of his great interest in the *Journal.*

Personally Dr. Chandler was a man of large interests and a ready sympathy. Those who knew him will remember with pleasure his entertaining and brilliant conversation and correspondence. He was possessed of a broad sense of humor and a keen wit, at once a source of delight to his friends and a weapon to be shunned by his enemies.

Benjamin Boss

Dudley Observatory

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE[1]

REPORT OF THE ASSOCIATE SECRETARY FOR THE SOUTH

The associate secretary entered upon his duties October 1, 1913. The first work was to prepare a circular letter which was forwarded to each of the 538 members of the association then residing in the territory of the thirteen southern states assigned by the permanent secretary. The text of this letter follows:

Dear Sir: The next annual meeting of the American Association is to be held at Atlanta, Ga., from December 29, 1913, to January 3, 1914.

To insure its success every member must cooperate.

We desire a large attendance and full programs. This is your opportunity to show your loyalty to the Association and your interest in its aims. Make it a point to be present and to participate in the discussions.

The Association has not the membership in our section which it should have. There has never been a time when the active cooperation of scientists was of such importance as it is to-day. The need of such cooperation is especially marked in the South. We need to get together, to exchange views and to stimulate scientific work. We need to exert our collective influence to secure better support for scientific activities, and greater discrimination in the filling of scientific posts.

The Atlanta meeting of the American Association offers an opportunity for southern men of science to show the country at large that a progressive spirit animates our section and that the cause of higher education and scientific research is being fostered among us.

Will you not constitute yourself a committee of one to secure new members and promote the Association's interests this year?

Enclosed are several membership application cards. Others will be supplied on request. Please make an effort to secure new members from among your colleagues, and urge their attendance at the meeting.

A stamped envelope is enclosed for your reply. I shall be glad to address personal letters to any individual whom you may suggest as eligible to membership. Please also make suggestions as to methods of procedure in advancing the work of the Association in your section.

Let each one do his part and the advancement of science in the South will be materially furthered by the Atlanta meeting.

Cordially yours,
Associate Secretary

With this letter there were enclosed two membership application cards and a stamped return envelope.

In addition a list of 37 members was selected from the representative colleges and universities of the southern states. To each of these a special letter was sent, the text of which follows:

Dear Professor: I am endeavoring to assist Dr. Howard in connection with the Atlanta meeting of the American Association, and I wish to request your personal cooperation.

It is unnecessary to urge upon you the importance of the American Association for men of science, and the obligation which rests upon us in the South to make the coming meeting a success. But if we would demonstrate to the other sections of the country that the South takes an active interest in the advancement of science, we must energetically encourage our colleagues to attend the Atlanta meeting.

I am addressing a circular letter to each southern member of the Association, a copy of which I enclose. But I wish to ask of you special assistance in your own institution.

[1] Presented to the Council at the Atlanta meeting.